when heated long enough. The glass beads are green after cooling, having been subjected to the oxidizing or the reduction fire.

Carbonate of soda dissolves it, forming a yellow mass in the oxidizing, and a green one in the reduction flame. In acids the substance is not soluble, except some iron with which it is contaminated.

The further qualitative chemical examination indicated the oxides of chromium, iron, and magnesium.

For want of means the quantitative determination of those elements was not undertaken, but reserved for some future time.

The mineral known under the name of chrome-ochre must not be confounded with the above, for chrome-ochre is described to be a silicate of alumina, tinged with the sesquioxide of chromium. We are also told that it is amorphous, and its occurrence on porphyry near Halle, and near Waldenburg in Silesia, or on a conglomerate, as near Creuzot in France, shows I think sufficient differences not to consider it to be identical with the California mineral on the chromite. My impression is, that the mineral described is a new species, and if so, I would propose to name it in honor of Mr. John C. Trautwine, the first observer, *Trautwineite.*

Prof. COPE remarked, that, through the kindness of Prof. B. F. Mudge, he had an opportunity of examining additional specimens of the turtle from the cretaceous of Kansas, described by him in the Proceedings of the Academy 1872 p. 129. The phalanges indicated a large flipper of the type of marine turtles. They are more flattened than in the *Propluridæ* so far as the latter are known, and are proportionally larger. The genus and species were named *Toxochelys latiremis.*

JANUARY 14.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-seven members present.

The following papers were offered for publication:—

"Materials for the study of the Phytophaga of the United States." By G. R. Crotch, M.A. "Notes on the species of Buprestidæ of the United States." By G. R. Crotch, M.A.

Prof. COPE made some observations on the structure and systematic position of the genus *Eobasileus* Cope. *Uintatherium* Leidy and *Dinoceras* Marsh were names applied to allied Mammals, so that the same would probably apply to them also. They had both been originally referred to the *Perissodactyla*, by their describers, and subsequently Marsh had stated (Am. Journ. Sci. Arts, July 18, 1872) that the species described by him

(*Titanotherium ?anceps*) is a Proboscidian, without giving any reasons therefor. The speaker, in describing the genus *Eobasileus* (Proc. Amer. Philos. Society, August 20, 1872) referred it to the Proboscidia, giving as reasons the structure of the bones of the leg and foot, and of the posterior part of the skull. Prof. Marsh (l. c. Aug. 24) refers his species again to the *Proboscidia*, stating as a reason, "that the limbs resemble those of *Mastodon*," and he refers it to a genus *Tinoceras*, without description. Later (l. c. Sept. 27, 1872), Prof. Marsh refers these animals to a new order, *Dinoceria* (*?Dinocerata*), withdrawing them from the *Proboscidia*. Lastly, he stated, at a meeting of the American Philosophical Society, Dec. 20, 1872), that this order differs from *Proboscidia* in the presence of canine teeth and horns, and the absence of incisors.

Until further evidence is presented, I adhere to my original position, that these animals are true *Proboscidia*, and cannot be referred to any other order. The reasons are as follows:—

1. The malar bone is rod-like, and forms the middle element of the zygomatic arch.
2. The cervical vertebræ are exceedingly short and transverse.
3. In the distally expanded ulna supporting much of the carpus, and the slender radius crossing it to the outer side.
4. The femur is without third trochanter.
5. Its condyles are contracted, and the narrow intercondylar fissure is prolonged far forwards.
6. The spine of the tibia is wanting, and the glenoid cavities separated by a longitudinal keel.
7. The astragalus is not hour-glass shaped above, but with a uniform face.
8. The short plantigrade calcaneum.
9. The phalanges are short and stout, and represent several toes.

To these may be added three external characters which directly result from the osteological, viz.:—

10. The possession of a proboscis. This is proven by the very short cervical vertebræ, and by the fact that the nasal and premaxillary bones are deeply excavated at their extremities, with surrounding osseous eminences, for the origin of the muscles of the trunk, and by the extreme stoutness of the nasal bones.
11. The extension of the femur below the body, so that the leg was extended with the knee below and free from the body, as in elephants, monkeys, and men.
12. The short plantigrade foot, so different from that seen in other divisions of *Ungulata*.

Other characters, common to *Proboscidia* and some other ungulates, are:—

13. The scapula acuminate in outline above the spine, with a very short coracoid.
14. Broad truncate occiput with widely separated temporal fossæ.
15. The greatly expanded iliac bones.

The dentition is not far removed from that of *Dinotherium*. The presence of canine teeth might not prove a ground of distinction between *Elephantidæ* and *Eobasileus*, since in both types the tusk is embraced by both the premaxillary and maxillary bones. It thus becomes exceedingly probable that the tusk of *Mastodon* and Elephant, regarded as an incisor by Cuvier, is really a canine. But should a real peculiarity exist in this point, as does in the presence of horns, the two cannot distinguish the family from this order. Such range of variation is well known to exist in the *Artiodactyla*, where some *Cervidæ* and *Antelopidæ* are horned and some not; and where musk-deer have canines and *Bovidæ* none; or where the omnivorous section have canines and lack horns, while *Bovidæ* have horns and lack canines.

The peculiar physiognomy of the Elephants is, as is well known, produced by the enormous development of the frontal sinuses. In *Dinotherium* this structure is greatly reduced, and in *Eobasileus* exists chiefly in the squamosal region. The physiognomy of the latter is also materially affected by the great prolongation forwards of the nasal bones, which support horns or processes at both extremities, and by the narrowing of the snout, producing a somewhat pig-like expression. The palatal surface of the mouth is thus greatly elongate and narrowed, and must have accommodated a very slender tongue. These modifications are but subordinate, and such as we find in different members of the same order.

On the Forms of Artificial Oxide of Zinc. By GEORGE A. KOENIG, Ph.D.—The specimen under examination is a piece of brick taken from a zinc furnace of Lasalle, Ill. It is a gift of Mr. Hegler, proprietor of the works, to C. E. Richter, M. E., from whom I obtained it. I am not aware that any description of its occurrence has been published, and am confirmed in this belief by the fact that it was given to Mr. Richter as a curious but unknown substance.

The surface of the brick is covered by a dirty greenish coating, the nature of which could not be ascertained on account of its extreme thinness. A part of the surface, about one inch square, is covered by a cluster of long hair-like needles of a brilliant white color and glassy lustre. These needles are very nearly posed parallel to each other and to the face of the brick, presenting somewhat the appearance as if part of a goat's beard had been cut off and put on the stone. A number of cavities in the brick contain these needles also, but here they are placed transversely like many minerals, for instance millerite.

In order not to spoil the specimen, I took only 0.1 gramme for analysis, and in this quantity could not obtain any other reaction but on zinc. This metal was first precipitated by ammoniac sulphide, then redissolved and precipitated by sodic carbonate. It weighed, after ignition, 0.095 gramme. This result leaves no doubt of the truth of the assertion, that the substance examined is pure oxide of zinc.

Placed under the microscope, with a magnifying power of 250 diameters, the needles present a purely prismatical habitus. Moreover, it seems apparent from the form of the basal termination, that the prisms belong to the hexagonal system.

The natural oxide of zinc, the zincite or red zinc ore, has not been found yet in well-defined crystals; but the massive specimens of Sparta, Franklin and Stirling, N. J., show a distinct cleavage after a hexagonal prism and after the hexagonal basis. Thus, the identity of form in the natural oxide of zinc and in the artificial oxide, would seem to be existing.

On a Boiler Incrustation from New Jersey. By GEORGE A. KOENIG, Ph.D.—Some time ago Mr. Joseph Harrison, Jr., presented to the Academy a specimen of boiler incrustation from Orange Co., N. J. The physical properties of this incrustation were remarkable enough to suggest a chemical examination. It was about half an inch thick, presented a smooth surface, was hard and coherent, of a brownish-flesh-color, and showed on the fracture a distinct prismatic structure, the prisms standing vertically on the surface. It looked very much like the so-called "Sprudelstein" from Karlsbad in Bohemia, which is aragonite.

The analysis gave the following results:—

Sulphuric acid (SO_3)	=	57.58
Calcic oxide (CaO)	=	40.40
Ferric oxide (Fe_2O_3)	=	0.54
Silicic acid (SiO_3)	=	0.05
Organic substance and water	=	1.00
		99.57

57.58 parts of sulphuric acid require, by theory, 40.306 parts of calcic oxide to form calcic sulphate, which latter number corresponds perfectly with the one found; we can say, hence, that the incrustation is composed of—

Calcic sulphate	=	97.89
Ferric hydrate	=	0.72
Silica		0.05
Organic matter		0.82

To my knowledge there has not been described, so far, a boiler

incrustation which is so very near chemically pure calcic sulphate, and none in which this is so perfectly anhydrous. We know that calcic sulphate occurs in nature in two forms. In one it is combined with two equivalents of water, viz.:—

Calcic sulphate	= 79.07
Water	= 20.93

crystallizing in oblique rhombic prisms, and is called gypsum. Then it is found without water, crystallized in orthorhombic prisms, and is named anhydrite.

We know further that gypsum begins to lose water not much above the boiling point of water, and can be rendered anhydrous by prolonged heating at about 200° centigrade. Still it seemed of interest to ascertain what changes would take place in a saturated solution of gypsum when evaporated under the atmospheric pressure at the boiling point, and also under a higher pressure.

A saturated solution of gypsum was kept at the boiling point until an ample amount of precipitate had formed. This precipitate consisted of minute scales with a marked silky lustre. Under a magnifying power of 60 diameters the scales proved to possess the characteristic tabular forms of gypsum with the oblique basis. They were perfectly transparent, and many were twins, those swallow-tail shaped forms so well known.

Upon ignition 20.7 per cent. of water was found instead of 20.93, as required by the formula.

A saturated solution of gypsum was now sealed up into a glass tube, and kept in an oil bath for fourteen hours at a temperature of 148° centigrade. This temperature is equal to a pressure of 4.4 atmospheres, or 66 pounds to the square inch.

A slight granular precipitate was found on the glass after removing the tube from the bath and drawing off the mother liquor. Under a magnifying power of 120 diameters the apparent granules dissolved into stellate groups of needle-shaped crystals intermixed with single needles of a larger size. Most of the crystals had the oblique rhombic basal termination of gypsum; but some showed an orthorhombic basis. All the crystals had become opaque, apparently by innumerable fissures, as a network could be discerned in many individuals. The presence of prismatic protuberances on some of the crystals standing at right angles to the principal axis of the main crystal seemed very curious.

The precipitate was now removed from the tube and carefully washed, then dried over sulphuric acid. After ignition a loss was produced of 3.1 per cent. Taking into consideration that not all of the mother liquor was washed out and crystallized as gypsum, this result may be looked upon as confirmatory that the whole of the precipitate is anhydrite. Professor Genth is of opinion that the opaque stellate crystals are pseudomorphs of anhydrite after gypsum, and there does not seem at present any reason to the contrary.

In nature we find the anhydrite associated with rock salt. Supposing that the deposition of the chlorides of sodium and potassium took place under a moderately high column of saturated water, the pressure exercised by this column would give a satisfactory explanation for the fact that calcic sulphate crystallized as anhydrite. The presence of gypsum in the same deposits would suggest a subsequent metamorphosis of the anhydrite into gypsum by taking up water.

JANUARY 21.

Dr. BRIDGES in the chair.

Twenty members present.

Notice of Fossil Vertebrates from the Miocene of Virginia.—Prof. LEIDY directed attention to some fossils, part of a small collection recently received. They were found imbedded in blue clay containing an abundance of fossil diatomes, among which Coscinodiscus is especially conspicuous. The fossil vertebrate remains consist mainly of vertebræ and teeth of cetaceans, vertebræ of bony fishes, teeth of sharks, and spines of rays. Among them also there is a portion of a humerus of a bird, and several worn teeth of a peccary. Besides these there are specimens which may be regarded as characteristic of the following undescribed species.

PROTOCAMELUS VIRGINIENSIS. Represented by the lower last premolar, and the first and last molars of an animal about the size of the existing Lama, and intermediate in size to *Protocamelus occidentalis* and *P. gracilis* of the tertiary of the Niobrara River, Nebraska.

TAUTOGA (PROTAUTOGA) CONIDENS. Represented by a premaxillary with teeth, and portion of another with the first tooth. The specimens indicate a much larger species than the living Black Fish *Tautoga*. The bones and relative position of the teeth exhibit some peculiarities. The premaxillary externally is flatter than in the Black Fish, and it appears as if it did not turn down in a hook-like end at its outer extremity. The teeth also are separated by comparatively wide intervals, independently of the interspaces provided for successional teeth. The form of the teeth is the same as in the Black Fish. One of the specimens contains the base of the first large tooth and a row behind of seven other teeth. The other specimen contains the first large tooth, which is nearly half an inch in length, but proportionately more robust than in the Black Fish.

ACIPENSER ORNATUS. Founded on a dorso-lateral plate indicating an extinct species of sturgeon of medium size. The length or height of the plate is about $2\frac{1}{2}$ inches; its breadth along the crest is an inch and three-fourths.